

# 여성 급성 심근경색증 환자의 연령에 따른 임상 양상 및 장기 추적 경과 관찰

정보영 · 하종원 · 최동훈 · 장양수 · 안신기  
임세중 · 정남식 · 심원흠 · 조승연 · 김성순

## Age-Related Difference in Long-Term Prognosis of Acute Myocardial Infarction in Women

Boyoung Joung, MD, Jong-Won Ha, MD, Donghoon Choi, MD, Yangsoo Jang, MD,  
Shin-ki Ahn, MD, Se-Joong Rim, MD, Namsik Chung, MD,  
Won-Heum Shim, MD, Seung-Yun Cho, MD and Sung-Soon Kim, MD

Cardiology Division, Yonsei Cardiovascular Center, Seoul, Korea

### ABSTRACT

**Background and Objectives :** The purpose of this study was to evaluate the age-related differences in clinical features, coronary anatomy, risk factors, hospital courses, and long-term prognosis of acute myocardial infarction (AMI) in women. **Materials and Methods :** Total 513 female patients with AMI were divided into 3 groups ; group 1 (n = 43, 50 years old or less), group 2 (n = 302, between 51 years and 70 years old), and group 3 (n = 168, older than 70 years). Clinical follow-up including cardiac events was performed for mean duration of 26 months (1 -155 months). Cardiac events include cardiac death, reinfarction, CABG, PTCA, CHF, stroke, and recurrent angina. **Results :** Minimal lesion (<50% stenosis) in infarct-related artery was more prevalent in group 1 than in group 3 (p<0.05). In group 2, the number of low high density lipoprotein (HDL) was significantly more than in group 3 (p<0.01). During hospitalization, death and shock were more prevalently observed in group 3 than group 1 (p<0.005) and group 2 (p<0.001). Group 3 had more heart failures than group 1 (p<0.001) and group 2 (p<0.001) and group 2 had more heart failures than group 1 (p<0.05). The younger age group showed a significantly higher survival rate (7 years : group 1 ; 76.1%, group 2 ; 60.6%, group 3 ; 34.2%, p<0.0001, Log Rank Stat = 49.4) and cardiac event-free survival rate (7 years : group 1 ; 48.4%, group 2 ; 32.3%, group 3 ; 16.0%, p<0.0001, Log Rank Stat = 37.5) for each 3 comparisons. In Cox proportional hazard analysis, LV systolic function influenced the group 2 survival (odds ratio 3.8, 95% CI 1.7 to 8.3, p<0.005) and the group 3 survival (odds ratio 2.2, 95% CI 1.1 to 4.5, p<0.05). The cardiac event free survival was influenced by age (odds ratio 1.6, 95% CI 1.2 to 2.1, p<0.005) and LV systolic function (odds ratio 1.8, 95% CI 1.3 to 2.5, p<0.001). **Conclusion :** Younger female patients with AMI had a more favorable prognosis compared with older female patients. LV systolic function was important as a prognostic factor for long-term survival except younger female AMI patients. (**Korean Circulation J 2000;30(10):1245-1256**)

**KEY WORDS :** Acute myocardialinfarction · Woman · Prognosis · Age.

: 2000 5 2  
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: , 120 - 749 134  
: (02) 361 - 7071 · : (02) 393 - 2041 E - mail : jwha@yumc.yonsei.ac.kr

# 서론

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## 대상 및 방법

대 상

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513 26 (1 155 )

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50 ), 2 ( : n=302, 51 70

), 3 ( : n=168, 71 )

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포항

), creatine kinase(CK), aspartate aminotransferase(AST), lactic dehydrogenase(LDH), ST  
Q, T 가  
13)  
Non-Q  
CK, CK-MB  
(creatine kinase MB), LDH, LDH isoenzyme, AST  
(left ventricular ejection fraction, EF)  
{LVEF(%) = (%D<sup>2</sup>) + [(1 - %D<sup>2</sup>)[%L]], where %D<sup>2</sup> = (LVED<sup>2</sup> - LVES<sup>2</sup>)/LV - ED<sup>2</sup> × 100%, and %L = fractional shortening of the long axis, mainly related to apical contraction, where 15% is normal ; 5%, hypokinetic apex ; 0%, akinetic apex ; - 5%, mildly dyskinetic apex ; and - 10%, apical aneurysm}.<sup>14)</sup>  
(ventricular tachycardia),  
(supraventricular tachycardia),  
(atrioventricular conduction disturbance),  
(intraventricular conduction disturbance)가

, , (HDL),  
 , 가 .  
 140/90 mmHg , 가  
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 24 48  
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 240 mg/dL ,  
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 (15)(16)  
 (ideal body weight) 120%  
 (17)(18) lipo -  
 protein(a) 30 mg/dL

94.0% 3 84.5% 3 2  
 Seldi - (p<0.005).  
 nger 1 74.3%, 2 55.7%,  
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 electronic caliper 가 0.05). 1  
 가 가 5117% 2 3 4514% 4313%  
 1 3 (p<0.05).  
 50%  
 (minimal lesion), 70% 3 1 (p<0.005)  
 (nonobstructive lesion) .<sup>19)</sup> 2 (p<0.001)  
 (delay in admission),  
 , , 가 .  
 , ,  
 (cardiac event) 관동맥 조영술 소견 (Table 2)  
 , , (coronary artery 1 65.1%, 2 68.5%, 3  
 bypass grafting, CABG), (percu - 37.5%가 3 1 (p<0.001)  
 taneous transluminal cononary angioplasty, PTCA), 2 (p<0.001)  
 (congestive heart failure), , (infarctrelated artery) 가 50%  
 4가 1 21.4%, 2  
 (major cardiac event) 13.6%, 3 4.8% 1  
 3 (p<0.05).  
 세 군간의 위험인자의 차이점 (Table 3)  
 가 1 2  
 Chi - square Fisher's 47.2% 46.8% 3 32.9%  
 exact , 2 3 (p<0.01).  
 lipotrotein(a) 가 가 1 55.6%, 2  
 ANOVA , multiple com - 46.2%, 3 46.5% 1  
 parison analysis Bonferroni 1 46.9%, 2 43.5%, 3 41.  
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 Kaplan - Meier ,  
 Log - rank , , 가 , 3  
 Cox .  
 propotional harzard . P  
 0.05 초기 입원 기간 중 경과 (Table 4)  
 1 4.7%, 2 14.  
 6%, 3 31.5% 3 1 (p<0.  
 005) 2 (p<0.001)  
 환자들의 기본적인 특징 (Table 1) 1 18.6%, 2 33.4%,  
 1 95.2%, 2 3 54.2% 3 1 (p<0.001)

2 (p<0.001) , 2 1 , 1 16.3%, 2  
 (p<0.05). (shock) 1 7. 20.5%, 3 29.2% 3 2  
 0%, 2 12.2%, 3 24.4% 3 (p<0.05).  
 1 (p<0.005) 2 (p<0.001)  
 . 1 0%, 2 6.6%, 3 퇴원후 추적 관찰 (Table 5)  
 13.7% 3 1 (p<0.01) 2 (p<0.01) 82% .

**Table 1.** Baseline characteristics among the three groups divided by the age

	Group 1 (n = 43) [no. (%)]	Group 2 (n = 302) [no. (%)]	Group 3 (n = 168) [no. (%)]
Age (years)	46 ± 5	62 ± 5	77 ± 5
Delay in admission (days)	7.4 ± 14.6	6.4 ± 8.9	4.3 ± 30.0
systolic BP (mmHg)	131 ± 38	122 ± 33	123 ± 34
diastolic BP (mmHg)	81 ± 21	78 ± 47	73 ± 22
Pulse rate (BPM)	82 ± 23	78 ± 21	85 ± 27
Previous angina			
Present	20 (54.1)	172 (62.5)	92 (63.9)
Duration (days)	483.3 ± 927.4	741.6 ± 1383.6	1084.2 ± 1704.7
Previous MI			
Present	1 ( 2.7)	11 ( 4.1)	5 ( 3.4)
Duration (months)	3.0	31.5 ± 26.5	77.3 ± 35.9
MI site			
Anterior	22 (51.2)	111 (27.0)	61 (36.3)
Inferior	10 (23.3)	88 (29.3)	45 (26.8)
Posterior	6 (14.0)	61 (20.3)	30 (17.9)
Lateral	4 ( 9.3)	14 ( 4.7)	10 ( 6.0)
Others	1 ( 2.3)	28 ( 9.3)	22 (13.1)
Chest pain*	40 (95.2)	282 (94.0)	142 (84.5)
Radiation†	26 (74.3)	151 (55.7)	78 (56.5)
Q - MI	33 (76.7)	244 (80.8)	138 (82.1)
Cardiac enzyme			
CK (IU/L)	1477.2 ± 1889.3	1128.2 ± 1150.8	1064.7 ± 930.6
CKMB (IU/L)	129.8 ± 145.9	130.8 ± 152.1	157.7 ± 292.5
LDH (IU/L)	354.0 ± 236.7	542.3 ± 836.6	448.1 ± 485.6
LV ejection fraction (%)‡	51 ± 17	45 ± 14	43 ± 13
EF< 40%	6/27 (22.2)	72/129 (35.8)	46/107 (43.0)
Management			
Thrombolysis§	10 (23.3)	77 (25.6)	11 ( 6.5)
Direct PTCA	1 ( 2.3)	6 ( 2 )	1 ( 0.6)
Rescue PTCA§	12 (27.9)	83 (27.5)	17 (10.1)

Abbreviations : BP denotes blood pressure ; MI, myocardial infarction ; Q-MI, myocardial infarction with Q wave ; CK, creatine kinase ; CK-MB, creatine kinase MB ; LDH, lactate dehydrogenase ; LV, left ventricle ; PTCA, percutaneous transluminal coronary angioplasty.

\* : significant difference among three groups (p<0.01). in group 3 significantly less than group 2 (p<0.005)

† : significant difference among three groups (p<0.01). in group 1 significantly more than group 2 (p<0.05)

‡ : significant difference among three groups (p<0.05). in group 1 significantly better than group 3 (p<0.05)

§ : significant difference among three groups (p<0.01). in group 3 significantly less than group 1 (p<0.005) and group 2 (p<0.01)

1 9. (p<0.05).  
 3%, 2 22.8%, 3 47.0% 3 1 (p<0.001) 2 (p<0.001) 2 1 2 1 2.7%, 2 8.3%, 3 15.5% 3 (p<0.05). 1

**Table 2.** Coronary angiographic findings among the three groups divided by the age

	Group 1 (n = 43) [no. (%)]	Group 2 (n = 302) [no. (%)]	Group 3 (n = 168) [no. (%)]
C-Angio performed*	28 (65.1)	207 (68.5)	63 (37.5)
Normal	1 ( 3.6)	2 ( 1.0)	0
Nonobstructive	2 ( 7.1)	10 ( 4.9)	1 ( 1.6)
No. of diseased vessels			
1	16 (57.1)	81 (39.3)	25 (39.1)
2	5 (17.9)	74 (35.7)	17 (27.0)
3	4 (14.3)	40 (19.4)	20 (31.3)
Site of IRA			
LAD	14 (50.0)	113 (54.9)	31 (49.2)
LCX	2 ( 7.1)	21 (10.2)	7 (11.1)
RCA	12 (42.9)	73 (35.3)	25 (39.7)
Stenosis of IRA			
Degree of the stenosis (%)	72 ± 37	80 ± 29	85 ± 20
< IRA 70%	8 (28.6)	36 (17.5)	8 (12.7)
< IRA 50% <sup>†</sup>	6 (21.4)	28 (13.6)	3 ( 4.8)
LVEDP (mmHg)	20.8 ± 7.6	21.1 ± 8.4	20.7 ± 9.5

Abbreviations : C-Angio denotes coronary angiography ; IRA, infarction related artery ; LAD, left anterior descending artery ; LCx, left circumflex artery ; RCA, right coronary artery ; LVEDP, left ventricular end diastolic pressure

\* : significant difference among three groups (p<0.001) in group 3 significantly less than group 1 (p<0.005) and group 2 (p<0.001)

† : significant difference among three groups (p<0.001). in group 1 significantly more than group 3 (p<0.05)

**Table 3.** Risk factors analysis among the three groups divided by the age

	Group 1 (n = 43) [no. (%)]	Group 2 (n = 302) [no. (%)]	Group 3 (n = 168) [no. (%)]
Hypercholesterolemia	6 ( 14.0)	74 (24.4)	33 (19.9)
Low HDL*	17 (47.2)	124 (46.8)	47 (32.9)
Hypertension	26 (60.5)	167 (55.4)	99 (59.6)
Diabetes	14 (32.6)	105 (34.8)	44 (26.5)
Family history	3 ( 7 )	21 ( 6.9)	6 ( 3.6)
Smoking	8 (18.6)	63 (20.8)	29 (17.5)
Obesity (IBW > 120%)	15/32 (46.9)	100/230 (43.5)	43/105 (41.0)
High Lp (a)	5/9 (55.6)	42/91 (46.2)	20/43 (46.5)
Total cholesterol (mg/dL)	186.0 ± 53.5	200.4 ± 52.3	193.8 ± 44.1
LDL (mg/dL)	122.9 ± 38.2	133.8 ± 48.4	127.2 ± 41.2
HDL (mg/dL)	37.8 ± 11.1	37.7 ± 11.1	39.8 ± 11.1
Triglyceride (mg/dL)	152.2 ± 78.7	156.2 ± 99.7	193.8 ± 44.1

Abbreviations : Hypercholesterolemia denotes total cholesterol 240mg/dL ; Low HDL, high density lipoprotein 35 mg/dL ; Obesity, ideal body weight (IBW) 120% ; High Lp (a), lipoprotein (a) 30 mg/dL ; LDL, low density lipoprotein

\* : significant difference among three groups (p<0.05). in group 2 significantly more than group 3 (p<0.01)

**Table 4.** Complications during admission between the groups

	Group 1 (n = 43) [no. (%) ]	Group 2 (n = 302) [no. (%) ]	Group 3 (n = 168) [no. (%) ]
Hospital death*	2 ( 4.7)	44 (14.6)	53 (31.5)
Congestive heart failure <sup>†</sup>	8 (18.6)	101 (33.4)	91 (54.2)
Shock*	3 ( 7.0)	37 (12.2)	41 (24.4)
Mechanical complication <sup>‡</sup>	0	20 ( 6.6)	23 (13.7)
Free wall rupture	0	3 ( 1.0)	6 ( 3.6)
VSD	0	5 ( 1.7)	7 (14.2)
MR	0	12 ( 4.0)	10 ( 6.0)
Arrhythmia <sup>§</sup>	7 (16.3)	62 (20.5)	49 (29.2)
VT, VF	3 ( 7.1)	24 ( 7.9)	15 ( 9.6)
SVT	1 ( 2.4)	7 ( 2.3)	17 (10.2)
AV and IV conduc dis	3 ( 7.6)	31 (10.3)	17 (10.2)
Other complications	3 ( 7.0)	44 (14.6)	15 ( 8.9)
Post MI angina	1 ( 2.3)	9 ( 3.0)	4 ( 2.4)
Pericarditis	0	2 ( 0.7)	2 ( 1.2)
Thromboembolism	1 ( 2.3)	4 ( 1.3)	1 ( 0.6)
LV aneurysm	1 ( 2.3)	24 ( 7.9)	8 ( 4.8)
LV aneuuryism + TE	0	5 ( 1.7)	0

Abbreviations : RV denotes right ventricle ; VSD, ventricular septal defect ; MR, mitral regurgitation ; VT, ventricular tachycardia ; VF, ventricular fibrillation ; SVT, supraventricular tachycardia ; AV and IV conduc dis, atrioventricular and intraventricular conduction disturbance ; MI, myocardial infarction ; LV, left ventricle ; TE, thromboembolism

\* : significant difference among three groups ( $p < 0.001$ ) in group 3 significantly more than group 1 ( $p < 0.005$ ) and group 2 ( $p < 0.001$ )

<sup>†</sup> : significant difference among three groups ( $p < 0.001$ ) in group 3 significantly more than group 1 ( $p < 0.001$ ) and group 2 ( $p < 0.001$ ), in group 2 significantly more than group 1 ( $p < 0.05$ )

<sup>‡</sup> : significant difference among three groups ( $p < 0.01$ ) in group 3 significantly more than group 1 ( $p < 0.01$ ) and group 2 ( $p < 0.01$ )

<sup>§</sup> : significant difference among three groups ( $p < 0.05$ ) in group 3 significantly more than group 2 ( $p < 0.05$ )

37.2%, 2 47.2%, 3 64.9% 3 1 ( $p < 0.001$ ) 2 ( $p < 0.001$ ) ,

1 25.6%, 2 33.3%, 3 56.0% 3 1 ( $p < 0.001$ ) 2 ( $p < 0.001$ ) ( $p < 0.001$ ).

Kaplan - Meier

가 (  $p < 0.0001$ , Log Rank Stat = 49.4), 1 2 ( $p < 0.05$ , Log Rank Stat = 5.4) 3 ( $p < 0.0001$ , Log Rank Stat = 20.1)

**Table 5.** Comparison of clinical outcome during follow-up period among the groups

	Group 1 (n = 43) [no. (%) ]	Group 2 (n = 302) [no. (%) ]	Group 3 (n = 168) [no. (%) ]
Total cardiac death <sup>a*</sup>	4 ( 9.3)	69 (22.8)	79 (47.0)
Follow-up cardiac death <sup>b†</sup>	2 ( 2.7)	25 ( 8.3)	26 (15.5)
Cardiac event <sup>c‡</sup>	16 (37.2)	143 (47.2)	109 (64.9)
Major cardiac event <sup>d‡</sup>	11 (25.6)	101 (33.3)	94 (56.0)
Reinfarction	3 ( 7.0)	12 ( 4.0)	8 ( 4.8)
CABG	2 ( 4.7)	16 ( 5.3)	5 ( 3.0)
PTCA	3 ( 7.0)	14 ( 4.6)	5 ( 3.0)
CHF	4 ( 9.3)	36 (11.9)	32 (19.0)
Recurrent angina	4 ( 9.3)	18 ( 6.0)	5 ( 3.0)
Last follow up status			
Alive	29 (67.4)	166 (54.8)	65 (38.7)
Death	5 (11.6)	75 (24.8)	80 (47.6)
Lost	9 (20.9)	62 (20.5)	23 (13.7)

Abbreviations : CABG denotes coronary artery bypass grafting ; PTCA, percutaneous transluminal coronary angioplasty ; CHF, congestive heart failure

a : Total cardiac death includes hospital death and follow-up cardiac death

b : Follow-up cardiac death excludes hospital death in total cardiac death

c : Cardiac events include cardiac death, reinfarction, CABG, PTCA, CHF, stroke, and recurrent angina

d : Major cardiac events include cardiac death, reinfarction, CABG, and PTCA

\* : significant difference among three groups ( $p < 0.001$ ) in group 3 significantly more than group 1 ( $p < 0.001$ ) and group 2 ( $p < 0.001$ ) in group 2 significantly more than group 1 ( $p < 0.05$ )

<sup>†</sup> : significant difference among three groups ( $p < 0.05$ ) in group 3 significantly more than group 2 ( $p < 0.05$ )

<sup>‡</sup> : significant difference among three groups ( $p < 0.001$ ) in group 3 significantly more than group 1 ( $p < 0.001$ ) and group 2 ( $p < 0.001$ )

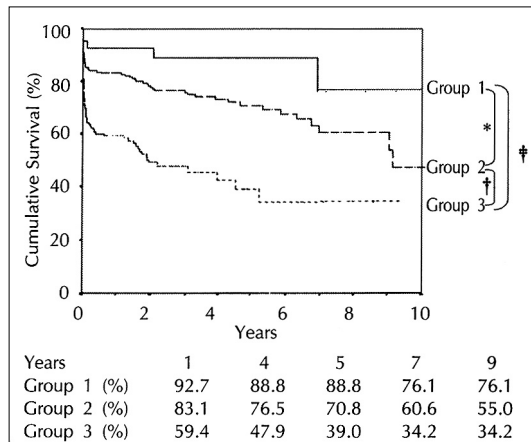
2 3 ( $p < 0.0001$ , Log Rank Stat = 36.6) (Fig. 1).

가

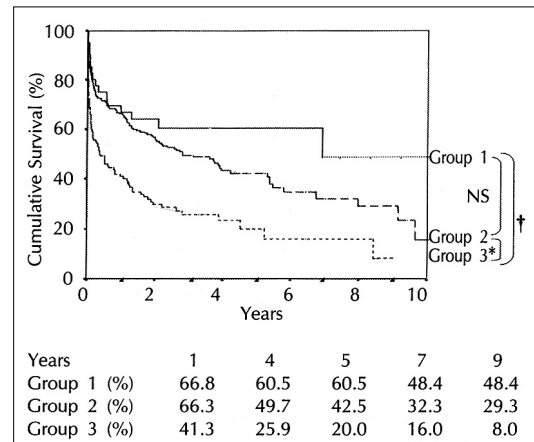
( $p < 0.05$ , Log Rank Stat = 27.7) (Fig. 2). Cardiac event free survival

가 ( $p < 0.0001$ , Log Rank Stat = 37.5) 1 3 ( $p < 0.0001$ , Log Rank Stat = 15.4), 2 3 ( $p < 0.0001$ , Log Rank Stat = 30.2) (Fig. 3). Major cardiac event free survival 가

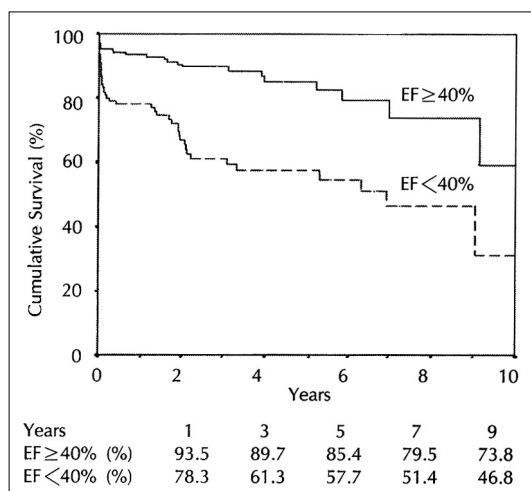
( $p < 0.0001$ , Log Rank Stat = 43.0) 1 3 ( $p < 0.0001$ , Log Rank Stat = 14.8), 2



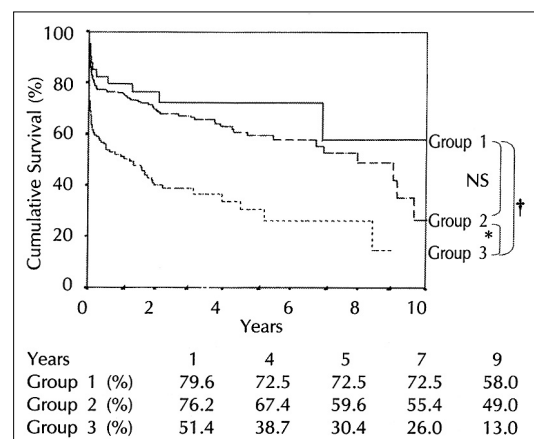
**Fig. 1.** Differences in survival among the three groups (note the statistical significant difference of survival among the three groups,  $p < 0.0001$ , Log Rank Stat = 49.4, \* :  $p < 0.05$ , Log Rank Stat = 5.4, † :  $p < 0.0001$ , Log Rank Stat = 36.6, ‡ :  $p < 0.0001$ , Log Rank Stat = 20.1).



**Fig. 3.** Cardiac event free survival among the three groups (note the statistical significant difference of survival among the three groups,  $p < 0.0001$ , Log Rank Stat = 37.5, NS : nonsignificant, \* :  $p < 0.0001$ , Log Rank Stat = 30.2, † :  $p < 0.0001$ , Log Rank Stat = 15.4).



**Fig. 2.** Differences in survival according to LV ejection fraction (note the statistical significant difference of survival between the two groups,  $p < 0.05$ , Log Rank Stat = 27.7).



**Fig. 4.** Major cardiac event free survival among the three groups (note the statistical significant difference of survival among the three groups,  $p < 0.0001$ , Log Rank Stat = 43.0, NS : nonsignificant, \* :  $p < 0.0001$ , Log Rank Stat = 36.4, † :  $p < 0.0001$ , Log Rank Stat = 14.8).

3 ( $p < 0.0001$ , Log Rank Stat = 36.4)(Fig. 4).  
Cox proportional hazard

(odds ratio 3.6, 95% CI 1.3-9.9,  $p < 0.05$ ),  
(odds ratio 3.0, 95% CI 1.8-5.0,  $p < 0.001$ )  
(odds ratio 2.4, 95% CI 1.5-3.8,  $p < 0.001$ )

(interaction)  
p 0.06 marginal interaction  
Cox proportional hazard  
(odds ratio 3.8, 95% CI 1.7-8.3,  $p < 0.005$ ),  
(odds ratio 2.2, 95% CI 1.1-4.5,  $p < 0.05$ )

cardiac event free survival 가 .  
(odds ratio 1.6, 95% 1.  
2 2.1, p<0.005), (odds ratio 1. 위험인자  
8, 95% 1.3 2.5, p<0.001) , major  
event free survival (odds 가  
ratio 1.8, 95% 1.3 2.6, p<0.005) . ,  
28 - 32)  
고 찰  
가 28)  
12)20 - 23) 가 가  
가 가  
47. (LDL) 가  
50 33)34)  
6 가 35 - 38) ,  
50 가 39)  
20)24) 가  
가 70 가 , 가 가  
70 21) 가  
70 25)26) 가  
임상 양상 가  
15% 가  
가  
가 lipoprotein (a)가  
가 가 40)41) lipop -  
가 19)27) rotein (a)가  
가 2.0 2.7 40)41) lipoprotein (a)가  
가 가 가 9%  
lipoprotein (a) 가





연구목적 :

방 법 :

513 1

( : n=43, 50 ), 2 ( : n=302, 51 70 ), 3 ( : n=168, 71 ) 26 (1 155 )

(cardiac event)

결 과 :

1) 1 51.0±16.7%, 2 44.9±13.9%, 3 42.8±13.3% 1 3 (p<0.05).

3 1 (p<0.005) 2 (p<0.001)

가 50%

1 21.4%, 2 13.6%, 3 4.8% 1 3 (p<0.05).

1 40.5%, 2 41.3%, 3 29.6% 2 3 (p<0.01).

3 1 (p<0.005) 2 (p<0.001) 3 1 (p<0.001) 2 (p<0.001) 2 1 (p<0.001)

2)

가 (7 : 1 - 76.1%, 2 - 60.6%, 3 - 34.2%, p<0.0001, Log Rank Stat=49.4). Cardiac event free survival 가 (7 = 1 - 48.4%, 2 - 32.2%, 3 - 16.0%, p<0.0001, Log Rank Stat = 37.5), 1 3 (p<0.0001, Log Rank Stat = 15.4), 2 3

( $p < 0.0001$ , Log Rank Stat = 30.2). Cox proportional hazard

1  
가 2 (odds ratio 3.8, 95%  
1.7 8.3, p<0.005) 3 (odds ratio 2.2, 95%  
1.1 4.5, p<0.05) . Cardiac ev -  
ent free survival  
(odds ratio 1.6, 95% 1.2 2.1, p<0. 005)  
(odds ratio 1.8, 95%

1.3 2.5,  $p < 0.001$ )가

## 결론 :

가  
cardiac event free survival

cardiac event free survival, ca-

중심 단어 :

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